Ministry of Agriculture & Land Reclamation
Agricultural Research Center
Central Lab for Agricultural Expert Systems

KSR COM
Runtime Library
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1-Introduction

The purpose of this document is to describe the KSR COM runtime library, which is used when building expert system. The document consists of two sections. Section 1 gives a brief description of COM, Section 2 demonstrates the description of the KSRCOM Library.

2-The Component Object Model (COM)

The Component Object Model is a technology by which the component can communicate with the outer-world. Such component can run in the same process, in different processes on the same machine, or even on different machines. Components can be implemented in any language. The advantages of such an approach include:
- Increasing reusability.
- A better version management
- Increase productivity.

The component communicates through well-defined interfaces. Each interface is a specification of a group of methods and functions.

2-KSR COM Runtime Library Descriptions

The KSR COM library is a group of methods under the interface called IKSRKB, these methods provide the expert system builders with the functionality required to build an expert system. The library consists of 52 methods. In this Section we will describe each method in terms of its purpose, its parameters, its output.

2-1 Method Name	OpenKBDoc

2-1-1 Description:
> *This method is used to open specific knowledge base, and set all default values in working memory.*

2-1-2 Input Parameters:

Input Name	Type	Meaning
str	String	The full path of the knowledge base

2-1-3 Output Parameters:
There is no output of this method

2-2 Method Name   CloseKB

2-2-1 Description:

> *This method is used to close the previously opened knowledge base, and clear memory.*

2-2-2 Input Parameters:

There is no input for this method.

2-2-3 Output Parameters:

There is no output of this method

2-3 Method Name   Abduct

2-3-1 Descriptions:

> *This method is used to get all concepts, its properties, and its legal, which existed, in the condition of the rules in the specific inference.* The action of those rules should contain the specific concept and property in the input parameter of this method.

2-3-2 Input Parameters:

Input Name	Type	Meaning
strCpt	String	The list of concept name separated by "@"
strInf	String	The inference name to be abducted.
strProp	String	The name of the property to be searched in the inference.

2-3-3 Output Parameters:

Output Name	Type	Meaning
List	String	String in format **"@Cpt.Prop1*Type=Legal1,LegalN"**

2-4 Method Name   AssertCptPropValToWM

2-4-1 Description:

> *This method is used to put concept and property and value, which is no existed in the knowledge base in the working memory.*

2-4-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The name of the concept
Prop	String	The name of the property.
Val	String	The name of the value.

2-4-3 Output Parameters:
There is no output for this method

2-5 Method Name   DelCptPropValFromWM

2-5-1 Descriptions:

> *This method is used to delete concept and property and value, from working memory.*

2-5-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The name of the concept
Prop	String	The name of the property.
Val	String	The name of the value.

2-5-3 Output Parameters:
There is no output of this method

2-6 Method Name   DeleteExpandedRule

2-6-1 Descriptions:

> *This method is used to delete rules of specific cluster from the knowledge base. Those expanded rules are added during runtime to the knowledge base*

2-6-2 Input Parameters:

Input Name	Type	Meaning
ssCluster	String	The name of the cluster

2-6-3 Output Parameters:
There is no output for this method

2-7 Method Name   DifferenceTwoDate

2-7-1 Descriptions:

This method is used to subtract two dates and return the difference in days.

2-7-2 Input Parameters:

Input Name	Type	Meaning
D	Long	The Day of the first date
M	Long	The Month of the first date
Y	Long	The Year of the first date
D1	Long	The Day of the second date
M1	Long	The Month of the second date
Y1	Long	The Year of the second date

2-7-3 Output Parameters:

Output Name	Type	Meaning
Dif	String	The difference of the two dates in string format

2-8 Method Name   ExpandRules

2-8-1 Descriptions:

This method is used to expand the generic rules of specific cluster to number of rules, which match specific concept in the working memory.

2-8-2 Input Parameters:

Input Name	Type	Meaning
ssCluster	String	The name of the cluster
ssWMKEY	String	The name of the concept and property in the format "Cpt-Prop"
ssCptReplaced	String	The name of the concept to be replaced.

2-8-3 Output Parameters:

There is no output of this method

2-9 Method Name   GetAllCpt

2-9-1 Descriptions:

This method return with all concept names in the knowledge base in the XML format

<Root> <Cpt Name="">></Root>

2-9-2 Input Parameters:

There is no input for this method.

2-9-3 Output Parameters:

Output Name	Type	Meaning
AllCpt	String	String in XML format represents all concept names in the knowledge base.

2-10 Method Name   GetAllProps

2-10-1 Descriptions:

This method return with all properties of specific concept in the knowledge base in the XML format

<Root> <Prop Name="" Prompt="" ></Root>

2-10-2 Input Parameters:

Input Name	Type	Meaning
strCpt	String	The name of the concept

2-10-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	String in XML format represents all the properties of the concept in the knowledge base.

2-11 Method Name   GetAllWM

2-11-1 Descriptions:

This method return with all working memory variables with its values in the html format

*Concept Name –Property Name = Value
*

2-11-2 Input Parameters:

There is no input for this method

2-11-3 Output Parameters:

Output Name	Type	Meaning
str	String	String in html format represents all variables in the working memory.

2-12 Method Name   GetArabicCpt

2-12-1 Descriptions:

This method return with the Arabic name of the English concept

2-12-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The English name of the concept

2-12-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	The Arabic name of the concept.

2-13 Method Name GetArabicProp

2-13-1 Descriptions:

> *This method return with the Arabic name of the English property*

2-13-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the concept
Prop	String	The English name of the property

2-13-3 Output Parameters:

Output Name	Type	Meaning
PropA	String	The Arabic name of the property.

2-14 Method Name GetAssertedFromWM

2-14-1 Descriptions:

> *This method gets the value of the asserted concept - property from the working memory.*

2-14-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the concept
Prop	String	The English name of the property

2-14-3 Output Parameters:

Output Name	Type	Meaning
Val	String	The value of the property.

2-15 Method Name   GetBasicData

2-15-1 Descriptions:

This method gets the entire concept, its property, and its legal values from the knowledge bas. The source of those properties is database.

2-15-2 Input Parameters:

There is no input for this method

2-15-3 Output Parameters:

Output Name	Type	Meaning
DB	String	String in format **"@Cpt.Prop1*Type=Legal1,LegalN.**

2-16 Method Name   GetChildList

2-16-1 Descriptions:

This method gets the entire child concept names of the specific concept from the knowledge bass in the XML format.

<Root><Val Name=""></Root>*

2-16-2 Input Parameters:

Input Name	Type	Meaning
strCpt	String	The English name of the concept

2-16-3 Output Parameters:

Output Name	Type	Meaning
ChildListXML	String	All Childs of the concept.

2-17 Method Name   GetChildListLevel1

2-17-1 Descriptions:

This method gets the first child level concept names of the specific concept from the knowledge bass in the XML format.

<Root><Cpt NameA="" NameL=""></Root>*

2-17-2 Input Parameters:

Input Name	Type	Meaning
strCpt	String	The English name of the concept

2-17-3 Output Parameters:

Output Name	Type	Meaning
ChildListXML	String	The first child level of the concept.

2-18 Method Name   GetConceptsByPropName

2-18-1 Descriptions:

This method gets all concepts, which have the same property from the knowledge bass in the XML format.

<Root><Cpt name=""></Root>

2-18-2 Input Parameters:

Input Name	Type	Meaning
Prop	String	The English name of the property

2-18-3 Output Parameters:

Output Name	Type	Meaning
List	String	All concept names in XML format.

2-19 Method Name   GetConfirmedDis

2-19-1 Descriptions:

This method gets all concepts, which have the specific property which have the value "Likely" OR "Most likely" .The returned concepts are separated by the "@"

2-19-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The English name of the property

2-19-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	All concept names separated with "@".

2-20 Method Name   GetCptFromWM

2-20-1 Descriptions:

> *This method gets all concept names from working memory, which has the specific property, which has the specific value. The returned concepts are in the XML format.*
>
> *<Root> <Cpt NameL="" NameA=""></Root>*

2-20-2 Input Parameters:

Input Name	Type	Meaning
Prop	String	The English name of the property
Val	String	The value of the property

2-20-3 Output Parameters:

Output Name	Type	Meaning
CptList	String	All concept names in XML format

2-21 Method Name   GetDisImage

2-21-1 Descriptions:

> *This method gets the image name associated with specific disorder, if there is no image associated with the disorder it returns "?"*

2-21-2 Input Parameters:

Input Name	Type	Meaning
DisStr	String	The English name of the disorder name

2-21-3 Output Parameters:

Output Name	Type	Meaning
ImageStr	String	String contains the image name or contains "?", which indicate empty association with that disorder.

2-22 Method Name   GetEnglishCpt

2-22-1 Descriptions:

> *This method return with the English name of the Arabic concept*

2-22-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The Arabic name of the concept

2-22-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	The English name of the concept otherwise an empty string returned.

2-23 Method Name   GetEnglishProp

2-23-1 Descriptions:

This method return with the English name of the Arabic property

2-23-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The Arabic name of the property

2-23-3 Output Parameters:

Output Name	Type	Meaning
PropA	String	The English name of the property.

2-24 Method Name   GetFromWM

2-24-1 Descriptions:

This method return with the value of the concept property from working memory

2-24-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property

2-24-3 Output Parameters:

Output Name	Type	Meaning
Val	String	The value of the property.

2-25 Method Name   GetInitConcept

2-25-1 Descriptions:

This method gets the entire concept, its property, and its legal values from the knowledge base. The source of those properties is user

2-25-2 Input Parameters:
There is no input for this method

2-25-3 Output Parameters:

Output Name	Type	Meaning
InitCpt	String	String in format **"@Cpt.Prop1*Type=Legal1,LegalN**..

2-26 Method Name   GetInitObs

2-26-1 Descriptions:

This method gets the entire concept, its property, and its legal values from the knowledge base. The source of those properties is user. The returned string is in XML format

<Root><Cpt NameL=""></Cpt></Root>

2-26-2 Input Parameters:
There is no input for this method

2-26-3 Output Parameters:

Output Name	Type	Meaning
InitObs	String	All concept which has source user in XML format

2-27 Method Name   GetLegal

2-27-1 Descriptions:

This method gets all legal values of specific property. The returned string is in XML format

<X><L>Legal Name</L></X>

2-27-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property

2-27-3 Output Parameters:

Output Name	Type	Meaning
Legal	String	All Legal values in XML format

2-28 Method Name   GetLegalA

2-28-1 Descriptions:

This method gets all Arabic legal values of specific property. The returned string is in XML format

<X><L>Legal Name</L></X>

2-28-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property

2-28-3 Output Parameters:

Output Name	Type	Meaning
Legal	String	All Arabic Legal values in XML format

2-29 Method Name   GetLegalAr

2-29-1 Descriptions:

This method gets the Arabic name of one English legal value.

2-29-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property
ArVal	String	The Arabic name of one legal

2-29-3 Output Parameters:

Output Name	Type	Meaning
Legal	String	The Arabic name of the English legal

2-30 Method Name   GetLegalE

2-30-1 Descriptions:

This method gets the English name of one Arabic legal value.

2-30-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property
ArVal	String	The English name of one legal

2-30-3 Output Parameters:

Output Name	Type	Meaning
Legal	String	The Arabic name of the English legal

2-31 Method Name GetLikelyConfirmedDis

2-31-1 Descriptions:

This method gets all concepts, which have the specific property which have the value "Likely".The returned concepts are separated by the "@"

2-31-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The English name of the property

2-31-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	All concept names separated with "@".

2-32 Method Name GetMostLikelyConfirmedDis

2-32-1 Descriptions:

This method gets all concepts, which have the specific property which have the value "Most Likely".The returned concepts are separated by the "@"

2-32-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The English name of the property

2-32-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	All concept names separated with "@".

2-33 Method Name GetPromptA

2-33-1 Descriptions:

This method gets the Arabic prompt of the specific property.

2-33-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property

2-33-3 Output Parameters:

Output Name	Type	Meaning
Prompt	String	The Arabic prompt of the property

2-34 Method Name   GetPromptL

2-34-1 Descriptions:

This method gets the English prompt of the specific property.

2-34-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property

2-34-3 Output Parameters:

Output Name	Type	Meaning
Prompt	String	The English prompt of the property

2-35 Method Name   GetProperName

2-35-1 Descriptions:

This method Convert the disorder name to upper case and remove the underscore from it, for displaying purpose.

2-35-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	Actual disorder name in the knowledge base

2-35-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	The upper case of the disorder name

2-36 Method Name   GetPropList

2-36-1 Descriptions:

This method gets the Properties of the specific concept .the returned string in XML format

<Root><Prop>Property name</Prop></Root>

2-36-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept

2-36-3 Output Parameters:

Output Name	Type	Meaning
PropList	String	The XML string represent all properties of specific concept

2-37 Method Name   GetSuspectedDisorders

2-37-1 Descriptions:

This method gets all concepts, which have the "confirm" property, which have the value "yes". The returned concepts are separated by the "@"

2-37-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The English name of the property

2-37-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	All concept names separated with "@".

2-38 Method Name   GetType

2-38-1 Descriptions:

This method gets the type of specific property

2-38-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the Concept
Prop	String	The English name of the property

2-38-3 Output Parameters:

Output Name	Type	Meaning
Type	String	String represent type name

2-39 Method Name   InstallArabicCptList

2-39-1 Descriptions:

This method construct Arabic concept list with all properties and facets this Arabic concept list contains only the concept which have Arabic name

2-39-2 Input Parameters:

There is no input of this method

2-39-3 Output Parameters:

There is no output of this method

2-40 Method Name　　　　　IsInWM

2-40-1 Descriptions:

This method checks on the concept-property-value is in working memory or not

2-40-2 Input Parameters:

Input Name	Type	Meaning
strCpt	String	The English name of the Concept
strProp	String	The English name of the property
strVal	String	The English name of the value

2-40-3 Output Parameters:

Output Name	Type	Meaning
Ret	String	TRUE if this value existed in working memory, otherwise FALSE

2-41 Method Name　　　　　OrderObligatoryList

2-41-1 Descriptions:

This method is used for treatment subsystem,

1-It make sure that the difference between two operations is not

　　less than three days according to the priority of disorder

2-It sort the operation According to

　　　- The date of the operation

It assume that all operation under the parent called "obligatory_material"

And all obligatory materials have a property called "name"

This method is used in cucumber treatment.

2-41-2 Input Parameters:

Input Name	Type	Meaning
strProp	String	The English name of the property By which the operations will be compared , in cucumber for example this property is "method"

2-41-3 Output Parameters:

Output Name	Type	Meaning
ChildList	String	List of sorted materials separated by #

2-42-1 Descriptions:

> *This method is used for treatment subsystem,*
> *1-It make sure that the difference between two operations is not*
>   *less than three days according to the method of the treatment*
> *2-It sort the operation According to*
>   *- The date of the operation*
> *It assume that all operation under the parent called "treat_op"*
> *Each disorder has one operation or more.*
> *This method is used in strawberry treatment.*

2-42-2 Input Parameters:

Input Name	Type	Meaning
strCpt	String	The English name of the concept The top object of all operations of treatment, it assume the method is "priority"

2-42-3 Output Parameters:

Output Name	Type	Meaning
ChildList	String	List of sorted materials separated by #

2-43 Method Name   **PlayInference**

2-43-1 Descriptions:

> *This method plays the inference and update the working memory*

2-43-2 Input Parameters:

Input Name	Type	Meaning
strInf	String	The name of the inference

2-43-3 Output Parameters:

There is no output of this method

2-44 Method Name   PrinWM

2-44-1 Descriptions:

> *This method is used for debugging purpose; it prints the content of working memory into html file called "WorkingMemory.htm" on at the current directory of the knowledge base.*

2-44-2 Input Parameters:

There is no input for this method

2-44-3 Output Parameters:

There is no output for this method

2-45 Method Name   RemoveCptPropFromWM

2-45-1 Descriptions:

> *This method removes all values of specific property from working memory.*

2-45-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the concept
Prop	String	The English name of the property

2-45-3 Output Parameters:

There is no output for this method

2-46 Method Name   ResetAllPropertyOfCptFromWM

2-46-1 Descriptions:

> *This method removes all property of specific concept from working memory.*

2-46-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the concept

2-46-3 Output Parameters:

There is no output for this method

2-47 Method Name   ResetWM

2-47-1 Descriptions:

> *This method reset all content of working memory*

2-47-2 Input Parameters:
There is no input for this method

2-47-3 Output Parameters:
There is no output for this method

2-48 Method Name   ReverseProperName

2-48-1 Descriptions:

> *This method converts the disorder name to lower case and replace the space between words into underscore.*

2-48-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The upper case of the disorder name

2-48-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	Actual disorder name in the knowledge base

2-49 Method Name   SetDBAssoListToWM

2-49-1 Descriptions:

> *This method traverse the database association list from working memory and set it to working memory.*

2-49-2 Input Parameters:
There is no input for this method
2-49-3 Output Parameters:
There is no output for this method

2-50 Method Name   SetToWM

2-50-1 Descriptions:

> *This method sets concept-property-value into working memory.*

2-50-2 Input Parameters:

Input Name	Type	Meaning
Cpt	String	The English name of the concept
Prop	String	The English name of the property
Val	String	The English name of the value

2-50-3 Output Parameters:

There is no output for this method

2-51 Method Name   TestKB

2-51-1 Descriptions:

This method tests the connection between COM and application.

2-51-2 Input Parameters:

There is no input for this method

2-51-3 Output Parameters:

Output Name	Type	Meaning
Str	String	String contains "It is work right" if the connection work otherwise it return empty string

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2-52 Method Name   Trim

2-52-1 Descriptions:

This method removes the left and right space from a concept or property or value.

2-52-2 Input Parameters:

Input Name	Type	Meaning
inStr	String	The name of concept or property or value

2-52-3 Output Parameters:

Output Name	Type	Meaning
outStr	String	The name of concept or property or value after removing left and write space